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Tank Battle And Trivia Quiz Games Development Using Construct 2 To Improve Critical Thinking Ability

Ariel Edmundo Han Kurniawan[1], Agus Cahyo Nugroho[2], Fx Hendra Prasetya[3]

[1,2,3]Department of Information Systems, Computer Science Faculty
Soegijapranata Catholic University
[1,2,3]Jl. Pawiyatan Luhur IV No.1, Bendan Duwur, Kota Semarang, Jawa Tengah 50234
[1]19n20013@student.unika.ac.id
[2]agus.nugroho@unika.ac.id
[3]hendra@unika.ac.id

Abstract— Game is something that is fun and entertaining 'of all time' and will always be in this world and can be enjoyed by both children, and adults. There are various types of games that are often played, including shooting and quiz games. Shooting Game has the main theme of shooting where players will beat each other to become the winner. While Quiz Game or often called Trivia Quiz is a game where players try to answer the questions given to get various kinds of prizes and become a winner. Construct 2 is a program for making games without writing programming code, because most of the game's logic can be arranged via the menu.

This study aims to create a game design that is a combination of Shooting Game and Trivia Quiz where players can play both types of games simultaneously. While the program used is construct 2. And the sample used is 16 years and over. The methodology used is object-oriented design methodology. The modeling tools used are use case diagrams, activity diagrams and class diagrams. The results of making this game show that combining more than one type of game can be done and make a game more interesting..

Keywords— construct 2, game, trivia quiz.

I. INTRODUCTION

In this day and age, the use of computers has grown rapidly and has become a necessity that cannot be separated from daily activities. Computers are widely used by people ranging from small children to the elderly to help complete and speed up work, process data, send information, print important documents and can even be used as a means of entertainment. One form of entertainment is playing games.

Computer games can be played in two ways, namely offline and online. Offline games have the advantage of being able to be used without an internet data connection, while online games have the advantage that players can play with other players directly around the world as long as they are connected to an internet connection.

There are various types of games, including Shooting Game. In this game shooting games are the main theme, because this game aims to defeat enemies using existing weapons. Next is the Quiz Game. In this game, players try to answer the questions correctly. Various kinds of prizes will be provided if the player answers the question correctly and there are penalties if the player cannot answer the question.

We can combine these two types of games into one game that is fun and interesting for the players who play it.

II. LITERATURE REVIEW

A. Definition of Games

Definition of Game or game from the opinion of some experts:

- John C Beck & Mitchell Wade : The game is entertainment that attracts attention and is real and is a good training tool in the present that requires solving problems that arise together.

- Ivan C. Sibero: Games are the most used and enjoyed by today's electronic media users.

- Fauzi A : Games are distractions that can refresh our minds from the tiredness caused by our daily routines and activities.

- Andik Susilo: Games can be addictive and difficult to forget, on a par with drug addiction.

- Albert Einstein : Game is a model of the highest investigation [1].

According to the Big Indonesian Dictionary, Game is defined as a Game. According to Wahono (in Agustina, R. Dan Chandra, A. 2017:25) game is a structured or semi-structured activity that aims as a means of entertainment and some for educational purposes [2].

B. Basic Elements of Game Creation

The basic elements of making a game (R. D. Duke, 1980):

1. Format: Is the structure of making a game that consists of several levels and has its own function.
2. Rules: Are rules that cannot be changed and must be obeyed by a player.
3. Policy: Is a rule that can be changed by a player so that it can be used to set the game strategy according to the wishes of the player.
4. Scenario: Is a series of scripts that are used as game guidelines.
5. Events: Events that can make game players happy.
6. Roles: These are rules of activities that can be carried out between players that can involve more than one player and can generate more value because players can exchange ideas about abilities between players.
7. Decisions: Is a right or wrong decision that must be decided by the player with careful consideration so that the player does not make the wrong decision so that the player is still interested in playing a game.
8. Levels: A game must have levels from easy to difficult so that it becomes interesting and fun to play.
9. Score Model: Is a rule that is used to calculate, record and bring up the value of a game being played so that the game becomes more fun.
10. Indicators: Is a sign for players for the results obtained in the game play. Indicators aim to make players more enthusiastic in playing games.
11. Symbols: Is a tangible form of elements, activities and decisions that can make players understand in playing the game [3].

C. Shooting Games

Shooting game is a game whose main theme is shooting. Where players will defeat their opponents by using the weapons that have been prepared [4].

D. Trivia Quiz

Often also called the Trivia Game is a game model that uses the brain in playing which aims to assess a person's ability to answer general questions or questions that are entertainment in nature [5].

For reference to other types of Trivia games, the researchers took references from the research by Emy Nurcahasanah and Sudarmilah who developed a trivia game to recognize the names of objects in three languages for early childhood. The results of this study illustrate that the game has been successfully improved and developed and has been tested [6].

E. Constructs 2

Construct 2 is a tool that will be used in designing various games, where programmers do not have to master coding knowledge. Just by dragging and dropping on existing items, adding attitudes, and making the game moveable through an event. Construct 2 has an interface similar to Microsoft Office. This will make it easier for a programmer who is used to using Microsoft Office. Due to HTML 5 being tested, some features may not work perfectly on existing devices. Construct 2 is a program that can be learned in a short time, and in creating games it can be done by exporting the game and running on mobile devices [7].

From other sources, Construct 2 is a tool that can be used to create games without writing programming code, because most of the game's logic can be adjusted through the menu (Dwiperdana, 2013). Construct 2 is an HTML5 based tool for creating games.

HTML5 is a markup language designed to organize and present content for the World Wide Web, and it is the core Internet technology originally proposed by Opera software. Construct 2 differs from other tools in that it requires programmers to write line by line to create objects. Construct 2 is based on objects, so you can easily create objects and manage their properties [8].

F. Computational Thinking

The 21st century is marked by increasingly complex problems faced by humans. According to The Organization for Economic Cooperation and Development (OECD, 2005), globalization and modernization have made the world more diverse and connected to one another. To understand and master well in this era, users must be proficient in technological change and understand the amount of information available. Computational thinking is one of the 21st century skills that must be developed for future generations [9].

Computational thinking is a way of thinking to solve complex problems using computer science techniques and concepts. Individuals are also directed to have critical, creative, communicative and collaborative thinking skills in solving a problem. Computational thinking also sharpens logical, mathematical, mechanical and modern knowledge [10].

G. Educational Games

Educational games are one example of games that can be developed. This is because the educational game method has several advantages compared to the conventional educational method. What stands out the most is that the description of the problem is more real. The Massachusetts Institute of Technology (MIT) has conducted experiments and proved that games can provide more benefits in increasing the logic and understanding of players in dealing with a problem through a game project called Scratch. From the results of previous research, it was found that educational games can support the teaching process because they can store learning materials for a long period of time compared to using conventional learning methods [11].

Educational games are games that are made with the aim of stimulating ways of thinking and increasing concentration and solving existing problems. Educational games are also a tool that can be used to teach and increase knowledge for the user through interesting means [12].

H. Flowmap

Flowmap is a graphical depiction of the steps and sequence of procedures from a program (Jogiyanto, 1999) [13].

III. RESEARCH METHODOLOGY

Methodology is formed from the words "Metodos" and "Logos". Methodos means the way of me … and Logos means knowledge. Methodology means the science of how to... Methodology means the way of working to understand an object that is the target of the science in question (Koentjaraningrat, 1989: 7). Research is a systematic process of collecting data or information and logical analysis of information (data) for a specific purpose. So research methodology is a scientific method used to obtain information with the aim of being a support in answering research questions or testing a hypothesis [14].

Data collection techniques depend on the research methodology to be used by a researcher. According to Sugiyono (2011: 9) the research method seen from the data analysis can be grouped into three, namely qualitative research methodology, quantitative research methodology and combined research methods [15].

If a qualitative research methodology is used, data collection methods are carried out in the form of interviews, observation, documentation or Focus Group Discussion (FGD).

Meanwhile, if a quantitative research methodology is used, data collection techniques are carried out in the form of interviews, questionnaires or observation.

The method to be used in collecting information and data is a quantitative research method. In this study a Post-Test questionnaire will be distributed which aims to determine the player's interest in playing tank battle games and trivia quizzes. Post-Test is distributed to players who have played tank battle games and trivia quizzes.

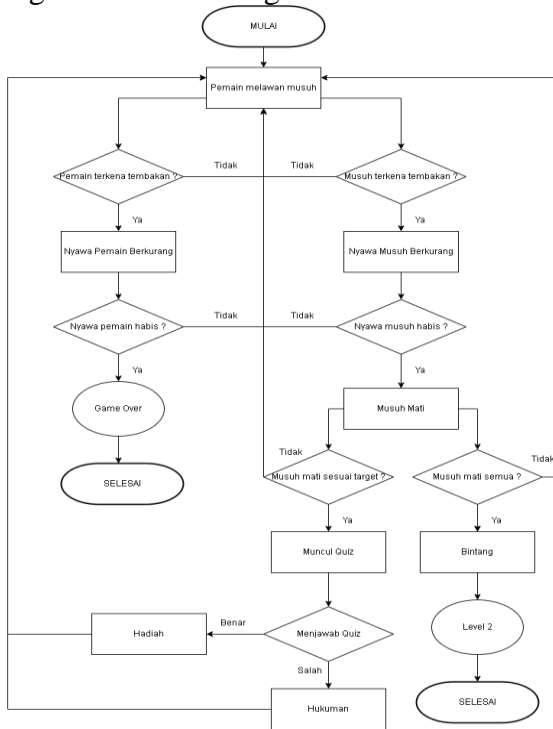## IV. RESULT AND DISCUSSION

Figure 1 is a level 1 game flowchart

Figure 1. Level 1 Game Flowchart
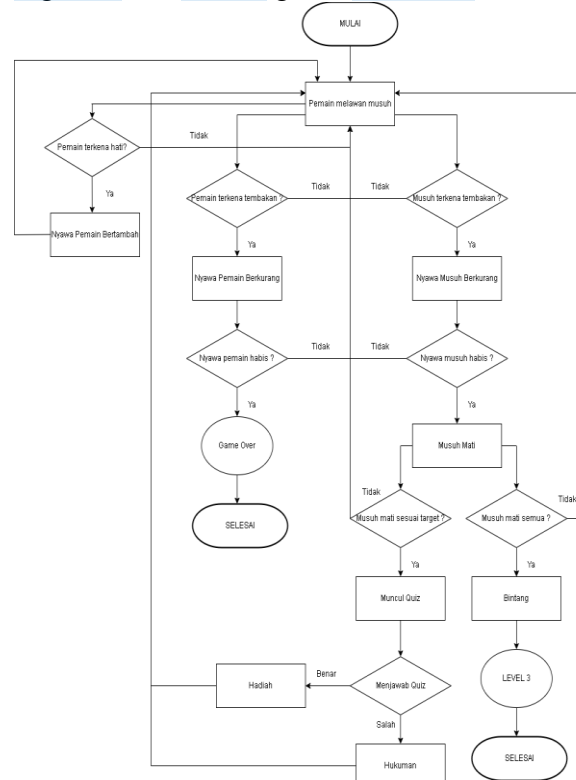
Figure 2 is a level 2 game flowchart

Figure 2. Level 2 Game Flowchart

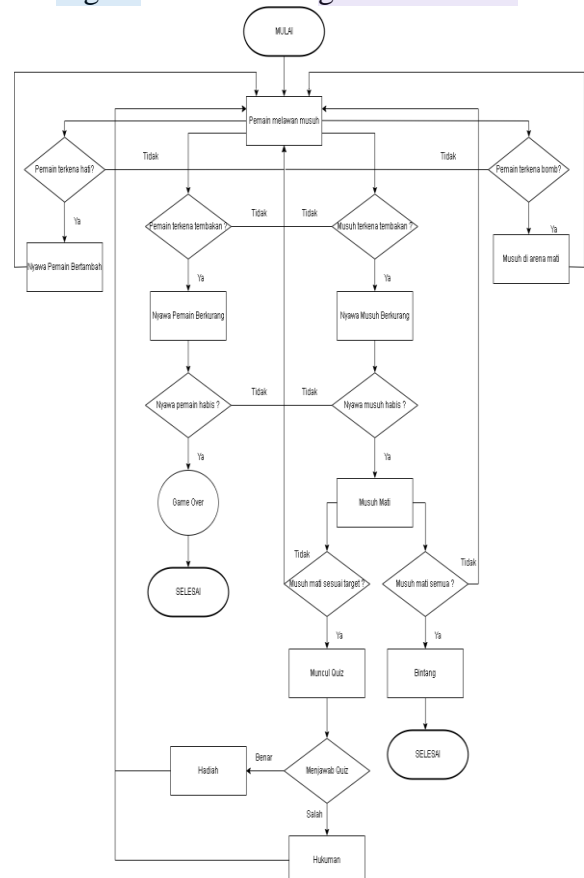Figure 3 is a level 3 game flowchart

Figure 3. Level 3 Game Flowchart

Figure 4 is the display of the main menu which functions as the initial appearance of the game which contains the play, exit and help buttons.

Figure 4. Display Main Menu

Figure 5 is a help display that functions as a guide for players in the game. In this view there is a home button.

Figure 5. Display Help

Figure 6 is a level 1 gameplay display. In this view there are 3 enemies, stars, 2 bullets, and enemy respawn points.
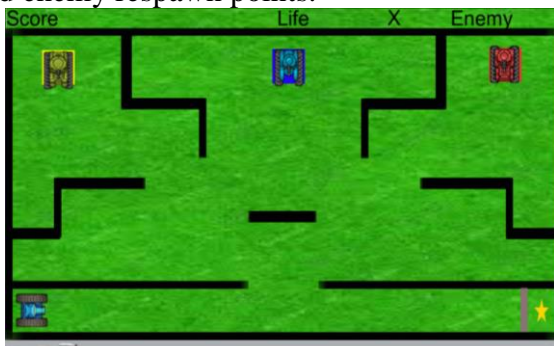

Figure 6. Gameplay Display Level 1

Figure 7 is a level 2 gameplay display. In this view there are 3 enemies, stars, hearts, 3 bullets, and enemy respawn points.

Figure 7. Gameplay Display Level 2

Figure 8 is a level 3 gameplay display. In this view there are 3 enemies, stars, hearts, bombs, 4 bullets, and enemy respawn points.
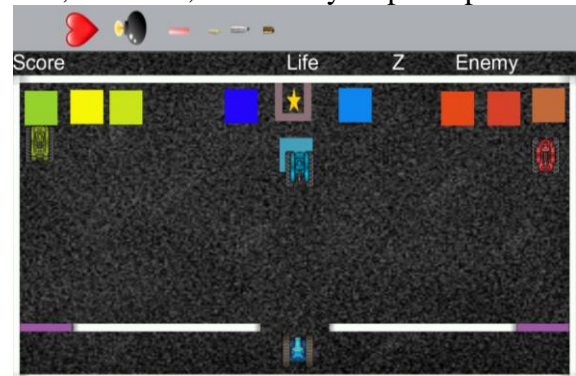

Figure 8. Gameplay Display Level 3

Figure 9 shows that the numbers in bold are the result of validity because the results are above 4. The EE variable represents effort expectancy, which means ease. However, the EE3 variable does not meet the validity test because it obtains a value below 4 so that it can be excluded, then the results of the validity test used can be seen in figure 9. The FC variable represents a facilitating condition which means a condition. The PE variable represents performance expectancy which means usability. The BI variable represents behavioral intention, which means behavioral intention. The HM variable represents hedonic motivation, which means hedonic motivation.

Rotated Component Matrixᵃ

	Component		
	1	2	3
PE1	.309	**.602**	.336
PE2	-.019	**.690**	.401
PE3	.321	**.675**	-.086
EE1	**.769**	.269	-.005
EE2	**.804**	.262	.142
HM1	.438	.219	**.680**
HM2	.197	.227	**.848**
HM3	.258	.184	**.813**
BI1	**.813**	-.059	.515
BI2	**.847**	-.029	.416
BI3	**.824**	.046	.407
FC1	.152	**.700**	.482
FC2	.033	**.786**	.430
FC3	.007	**.763**	.008

Extraction Method: Principal Component Analysis.
Rotation Method: Equamax with Kaiser Normalization.
a. Rotation converged in 9 iterations.

Figure 9. Validity Test

Figure 10 shows that the reliability of PE with cronbach alpha 712 is considered acceptable, the reliability of EE with cronbach alpha 752 is considered acceptable, the reliability of HM with cronbach alpha 877 is considered good, the reliability of BI with cronbach alpha 974 is considered Excellent, the reliability of FC with cronbach alpha 840 is including good.

Reliabilitas	*Cronbach alpha*	Internal
PE	712	*Acceptable*
EE	752	*Acceptable*
HM	877	*Good*
BI	974	*Excellent*
FC	840	*Good*

Figure 10. Reliability Test Results

Figure 11 can be seen the correlation created between variables. Statistically, the SEE and SHM variables correlate with SBI because the significant value is less than 0.01 and is marked with an asterisk. But in general the SEE variable represents the ease of playing the game and the SHM variable represents a sense of being entertained, happy and relaxed, this affects the intention to play this game again. While the SPE variable statistically correlates with SBI because the significant value is smaller than 0.05 and is marked with an asterisk, and generally represents usefulness in terms of adding insight, and eliminating boredom, it turns out to have an influence on increasing player intentions in playing battle tank games and trivia quizzes. SFC variable is not correlated with SBI because there is no significant value. In general, SFC represents conditions that support players to play this game but based on the questionnaire this does not support the player's intention to play again.

Correlations

		SBI	SEE	SFC	SHM	SPE
SBI	Pearson Correlation	1	.693**	.246	.624**	.334*
	Sig. (2-tailed)		.000	.085	.000	.018
	N	50	50	50	50	50
SEE	Pearson Correlation	.693**	1	.328*	.473**	.462**
	Sig. (2-tailed)	.000		.020	.001	.001
	N	50	50	50	50	50
SFC	Pearson Correlation	.246	.328*	1	.502**	.687**
	Sig. (2-tailed)	.085	.020		.000	.000
	N	50	50	50	50	50
SHM	Pearson Correlation	.624**	.473**	.502**	1	.512**
	Sig. (2-tailed)	.000	.001	.000		.000
	N	50	50	50	50	50
SPE	Pearson Correlation	.334*	.462**	.687**	.512**	1
	Sig. (2-tailed)	.018	.001	.000	.000	
	N	50	50	50	50	50

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Figure 11. Correlation Test Results

IV. CONCLUSION

Conclusions obtained from making tank battle games and trivia quizzes with construct 2 to hone thinking skills:

1. To design an interesting tank battle game, references from several pre-existing tank battle games must be needed.

2. To design an interesting trivia quiz, references from several quiz questions are needed and find questions that are suitable for use as quiz material.

3. To combine the tank battle game and the trivia quiz, it is necessary to arrange the exchange between the tank battle and the quiz by bringing up the quiz when the player has finished off the enemy with a predetermined number of targets and if the player answers the quiz, both right and wrong, then there is a reward and punishment.

4. Players' interest in playing tank battle games and trivia quizzes is 48%. This is obtained from questions related to playing tank games and trivia quizzes in the future.

5. To get people interested in honing their thinking skills while playing games, it is necessary to choose interesting image assets, interesting audio, and choose interesting quiz questions.

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